EXHIBIT 1

City of Pekin

Wastewater Treatment Facilities

REQUEST FOR PROPOSALS

The City of Pekin, Illinois, is requesting proposals from interested, experienced and qualified firms to operate and maintain its wastewater treatment plants and lift stations, and combined sever overflows.

Attachments:

Attachment #1 describes the current plant equipment and operation, and compares that facility with projected needs for expanded facilities. The document, "Wastewater Treatment Plant No. 1; Basis of Design for Improvements to the Federal Prison Facility", was prepared by Environmental Science and Engineering Inc. in June, 1991.

Attachment #2 is a diagram of the treatment plant. Attachment #3 is a "Buildings and Grounds Description" of Wastewater Treatment Plants No. 1 and No. 2. Attachment #4 is a description and map of the locations of the lift stations. Attachment #5 is the current fiscal year's budget for the operation of the WWTP and lift station repair. It does not include regular lift station manpower which is a part of the Street Department's budget but not separately identified and costs are not segregated. Non-manpower lift station expenditures are budgeted with the Wastewater Treatment Plant. Also included in the budget are costs for the operation of Wastewater Treatment Plant No. 2, which is used to store peak overflows. The budget also includes the operation of the City's four Combined Sewer Overflows. Attachment #6 is a map of the locations of the combined sewer overflows. Attachment #7 is a copy of the current NPDES permit for Wastewater Treatment Plant No. 1.

Submittal Requirements:

1. Proponents are to submit complete proposals, inclusive of all projected or anticipated annual costs to the City for a 10-year period, and in contract format.

2. A list of plants similarly operated by the proponent in cities or sanitary districts of comparable size, including information of size of plant in those cities, basic treatment characteristics, NPDES permit requirements and responsible individuals to contract for further information.

3. A most recent corporate financial report and financial history, particularly pointing out the role of similar contract operations in that financial history.

4. An indication of how the City of Pekin plant would be operated, by whom and with what technical backgrounds; evidence of ability to comply with Illinois state certification regulations for operators; ability to comply with local prevailing wage rate ordinances, performance of operation and maintenance engineering; relationship of supervisor to company technical backup personnel and their availability to provide support and how that would be provided. Include statements as to how current City employees might be incorporated into the staffing plan.

5. A description of the equipment preventive maintenance system or program that would be put in place.

6. An estimated annual budget covering all operating costs for the first year of operation, with annual projections to the extent possible over the ten-year (or 5-year) contract period.

7. The proposed contract will include as a part of the proponent's costs the regular and anticipated maintenance and repair of equipment, plus replacements of equipment and parts to a specific extent, as distinguished from those equipment and building replacements which would be the responsibility of the City. The proponent will make that distinction clear and as specific a possible.

8. Alternate fully costed proposals are requested as follows: a) for the operation of the Wastewater Treatment Plant; b) for the operation of the wastewater treatment plant and lift stations.

9. The proponent's proposal will assume responsibility for all reports required by the state and national regulatory agencies, and will regularly report to the City in a manner described in the proposal.

10. Anticipated responsibility for representing the City in management and interagency meetings and discussions regarding plant operations and future upgrades.

11. Assume the costs for any fines or penalties levied against the City for improper operation of the WWT facilities.

12. Indicate the company name, headquarters and office distribution, ownership names and structure.

13. Date of proposed initiation of operation.

14. Detail insurance coverage over operation of the facilities, including errors and omissions coverage.

15. Indication that the proponent is capable of securing and posting a performance bond in an amount equal to the contract sum for the annual cost of operation, and graduated annually.

16. All proposals are to be

ATTACHMENT #1

BASIS OF DESIGN
FOR
IMPROVEMENTS RELATED TO THE
FEDERAL BUREAU OF PRISON (FBOP) FACILITY

I. Purpose

The purpose of developing a basis of design for improvements to the treatment system is to compare existing facilities with projected needs in order to ascertain the adequacy of existing equipment and plan for new or expanded facilities. The basis of design also serves as a descriptive plan for the treatment system and as a readily available guide for process control decisions. The Basis of Design in outline form is found in Appendix A.

Improvements to the treatment system will be designed in compliance with Title 35, Illinois Administrative Code, Part 370: Illinois Recommended Standards for Sewage Works, hereafter referred to as IEPA's design criteria.

II. Wastewater Characteristics

The existing treatment system is designed for an average flow of 4.1 million gallons per day (MGD) and a maximum flow of 7.4 MGD. Maximum flows typically occur during rainfall events when the combined sewer system can contribute significant flows to the collection system. High flows can also result from melting snow and ice. Currently the dry-weather flow to the treatment plant averages about 3.37 MGD based on recorded flow data for a recent 12 month period.

The existing treatment system is designed to treat up to 6839 pounds per day of biochemical oxygen demand (BOD) and up to 8549 pounds per day of total suspended solids (TSS). These ratings reflect raw sewage concentrations of 200 parts per million BOD and 250 parts per million TSS. These concentrations are typical of domestic sewage.

The proposed federal prison is anticipated to contribute additional flow, BOD, and TSS to the treatment facility. Diurnal peaks in flow and organic loading from the prison are expected, resulting from daily trends in inmate activity, laundry service, and food preparation. Sewage flow from the prison is estimated to average 255,000 gallons per day, with diurnal peaks representing a daily flow of 382,500 gallons per day. It is anticipated that the prison will contribute 1063 pounds per day of BOD and 1063 pounds per day of TSS, representing concentrations of 500 parts per million BOD and TSS (concentration and flow data supplied by FBOP). Sewage from prison facilities is typically stronger than ordinary domestic sewage, due to the concentration resulting from the activities mentioned.

To accommodate the flow and organic loading from the proposed federal prison, the capacity of the existing treatment plant must be increased. The capacity of the improved treatment system will be 7902 pounds per day BOD and 9612 pounds per day TSS, with a design average flow of 4.5 MGD and a design maximum flow of 8.74 MGD.

The concentrations and flow include only sanitary sewage and do not include any industrial activity within the prison facility. When the FBOP identifies the type of industrial activity to be performed, further evaluation of sewage treatment should be conducted.

III. Pretreatment Facility

The existing pretreatment facility includes a mechanically cleaned bar screen and an aerated grit chamber. These facilities were added during improvements made in 1983. The bar screen and aerated grit chamber are rated by the manufacturer for maximum sewage flows of up to 5.7 MGD, although actual experience has shown that higher flows can be accommodated. An older bar screen has been retained as a back-up in the event that the newer screen fails. The old bar screen is followed by an old mechanical grit removal system that is no longer operational.

The existing pretreatment facility operates well at normal flows and design loadings. The existing bar screen allows the passage of debris, leaves, and other material during high flows. The existing aerated grit system allows the passage of significant quantities of grit and sand during periods of high flows. The federal prison is anticipated to contribute significant additional quantities of grit. For these reasons the pretreatment facility should be upgraded prior to increasing flow to the treatment system.

In August of 1990 the City requested that ESE conduct a Study of storm-flow related improvements for the treatment facility. The Study recommended that the old bar screen and mechanical grit removal system be removed and a screenings grinder device be installed in the old bar screen channel. The Study further recommended automation of the sluice gates controlling the flow to the pretreatment facilities, in order to use the existing bar screen during normal flows and the screenings grinder during storm flows.

In lieu of adding a new bar screen system to accommodate the prison improvements as indicated in the "Wastewater Treatment Facilities Improvements Related to the Proposed Prison Facility" dated November 28, 1990, it is recommended that a screenings grinder be installed as suggested in the study of storm-flow related improvements. A screenings grinder will improve the functional capabilities of the pretreatment facility.

IEPA's design criteria for aerated grit removal systems requires a detention time of no less than 3 minutes at peak flow. The existing grit chamber has a theoretical detention time of 4.13 minutes even at flows of 8.74 MGD, well within compliance with IEPA's criteria. However, actual experience has shown that theoretical detention times do not always occur, and it is entirely possible that much shorter detention times are prevalent during peak flows.

In order to insure adequate removal of grit from the prison sewage flow and during storm events, it is recommended that an additional grit chamber be constructed adjacent to the existing chamber. Such construction would allow the operation of both units during storm flows, and operation of either unit during normal flows. Duplicate units would also provide redundancy in the event of a failure within either chamber. Expanded grit removal equipment would be incorporated in the existing grit building.

IV. Primary Treatment

The existing primary treatment facilities are comprised of four circular clarifiers. Two of the clarifiers are 45 feet in diameter and were built in 1939 as part of the original treatment plant and upgraded in 1974. The other two clarifiers are 55 feet in diameter and were added in 1963 as part of a series of improvements.

The existing primary clarifiers remove grease and scum using surface skimmers, and sludge is removed by positive displacement sludge pumps. The clarifiers provide 7932 square feet of surface area, with a total volume of 68,947 cubic feet, or 515,724 gallons. Based on this volume, the primary clarifiers provide a detention time of 100 minutes at a current peak flow of 7.4 MGD.

IEPA design criteria for primary clarifiers recommends that surface settling rates not exceed 1000 gallons per day per square foot based on peak hourly flow. The clarifier surface area of 7932 square feet allows a peak flow of only 7.9 MGD.

In order to accommodate the projected peak flow of 8.74 MGD, additional primary clarifier surface area must be constructed. It is recommended that an additional clarifier be constructed east of the existing 55-foot diameter primaries, in the area now occupied by sludge lagoons. If another 55-foot diameter primary clarifier were constructed, the primary treatment system could accommodate a peak flow of 10.3 MGD, which is more than adequate for the projected maximum flow of 8.74 MGD. A new primary clarifier in this location could potentially utilize gravity piping extending from the existing east primary flow splitter for influent, and gravity piping to the existing 30" primary sewer for effluent.

The existing primary sludge pumps are currently scheduled for replacement and/or improvements in the summer of 1991. One new diaphragm sludge pump will replace the existing 7 inch piston pump, and a primary sludge grinder will be added as part of the Primary and Sludge Pumping Improvements. Additional piping, metering, and control improvements will also be made.

The primary sludge pumping system, after the Primary and Sludge Pumping Improvement project, will be more than adequate for the anticipated needs.

The existing primary clarifier mechanisms are scheduled for replacement and/or rehabilitation in the near future and will not be affected by the prison improvements.

V. Primary Effluent Pumping

The existing primary effluent pumps are currently scheduled for replacement in the fall of 1991. Five new 20 horsepower submersible sewage pumps will be installed as part of the Primary and Sludge Pumping Improvements. The five new pumps will be rated for a peak flow of 12.4 MGD, and the capacity even with one pump out of service will be 9.5 MGD. All five pumps will be identical in size and capacity.

The primary effluent pumping system, after the Primary and Sludge Pumping Improvement project, will be more than adequate for the projected peak flows.

VI. Secondary Treatment

The existing secondary treatment facilities are comprised of two circular, multi-compartment tanks divided into contact aeration, reaeration, clarification, aerobic digestion, and chlorine contact. The units are 120 feet in diameter and were constructed in 1970. Adjacent to the circular treatment units is a building that houses two engine-driven positive displacement blowers and one electrically-driven positive displacement blower.

The existing reaeration zones each hold 27,450 CF (205,000 GAL) of mixed liquor under aeration. Air is applied using fine bubble diffusers. The air piping and diffusers were replaced in 1988. Sludge is wasted from the reaeration zones to the south unit aerobic digester zone using 6" air lift sludge pumps.

The existing contact aeration zones also hold 27,450 CF (205,000 GAL), and contain a mixture of mixed liquor and primary effluent under aeration. Air is applied using fine bubble diffusers. The air piping and diffusers were replaced in 1988.

The existing 70-foot diameter clarifiers utilize a traveling bridge collector mechanism. Return sludge is pumped to the reaeration zone using a 12" air lift sludge pump rated for 1.4 MGD maximum flow. Return sludge is collected from the tank bottom using suction tubes mounted on the collector arms. The surface of the clarifier is skimmed to remove floatables using an arm and beach system, and scum is pumped to the aerobic digester zone using a 4" air lift pump.

The existing aerobic digester zones each hold 23,150 CF (173,000 GAL). The south aerobic digester is presently used as a holding tank for waste activated sludge waiting to be processed on the gravity belt thickener. Each aerobic digester is equipped with two 4" air lift sludge pumps. The aerobic digester zones can be aerated using course bubble diffusers.

The existing chlorine contact zones each hold 5500 CF (41,000 GAL). Secondary effluent is chlorinated seasonally and aerated to improve fecal coliform destruction. The chlorine contact zones are discussed more in the section on Disinfection.

The three existing blowers are each rated for 3500 CFM, for a total system capacity of 10,500 CFM. The blowers were added in 1970. Two of the blowers are driven by Caterpillar G342-NA 6 cylinder natural gas engines. One blower is driven by a 200 HP, 480 VAC single-speed electric motor. The electric motor was replaced in 1990.

IEPA design criteria for aeration systems requires a design loading rate of 50 LBS BOD per day per 1000 CF of tank volume (contact & reaeration combined), 1500 CF Air per LB of BOD, return sludge pumps capable of 15%-100% of peak flow, waste sludge pumps capable of at least 25% of peak flow, and air piping sized to be capable of carrying 200% of normal requirements. Blower capacity must be such that a 2.0 PPM minimum dissolved oxygen level can be maintained with the largest blower out of service.

IEPA design criteria for secondary settling facilities requires a design surface loading rate of not more than 1000 gallons per square foot per day. In addition, solids loading cannot exceed 50 LBS per day per square foot at peak flow.
To accommodate the projected primary effluent load of 5532 LBS of BOD per day and a peak flow of 8.74 MGD, a number of secondary treatment improvements must be made.

First, additional aeration capacity must be brought into service. It is recommended that a new aeration system be constructed east of the existing north secondary treatment unit, increasing the overall capacity of the system to approximately 8235 LBS of BOD per day. The new aeration system would include a new reaeration tank as well as a new contact aeration tank in order to maintain the new system as a separate treatment unit. Primary effluent flows would be divided using the existing flow splitter, with rate of flow adjustable to the new aeration system.

Secondly, additional settling capacity must be constructed. It is recommended that a new secondary clarifier be constructed east of the existing north secondary treatment unit. If a conservative design surface loading rate of 800 gallons per square foot per day is used, a new 70-foot diameter clarifier would increase peak flow capacity to over 8.74 MGD. This conservative surface loading rate would minimize sludge loss during storm flows, an important parameter to limiting effluent suspended solids concentrations.

Thirdly, additional blower capacity should be added. For the projected peak load of 5532 LBS of BOD per day, the mechanical blower system must be capable of 5762 CFM with the largest blower out of service, excluding other equipment requiring air. Other equipment requiring air include the air lift return pumps, the chlorine contact air diffusers, aerobic digesters, aerated grit tank, and other miscellaneous air lift pumps and spargers. Peak hourly loading rates may exceed the capabilities of two blowers, requiring a third blower to be placed on line for short periods of time. It is recommended that another 3500 CFM electric blower be added to increase system capacity to 10,500 CFM with one blower out of service. Air piping modifications may also be necessary in order to comply with IEPA's requirement for piping capable of 200% of normal air needs.

Lastly, return activated and waste activated sludge pumping capacity must be added for the new aeration system and secondary clarifier. For return sludge pumping, two variable speed centrifugal pumps are recommended, each with a capacity of 3.0 MGD. The pumps would be flow paced to maintain a given rate of return based on the flow from the new secondary clarifier. The existing air lift return sludge pumps would also be modified in order to be flow paced. For waste sludge pumping, two variable speed centrifugal pumps are recommended, each with a capacity of 1.0 MGD. The pumps would be variable speed in order to allow matching pump output to wasting rate needs.

VII. Effluent Disinfection

The existing chlorination system is currently scheduled for replacement and/or upgrading in the summer of 1991. Automated chlorinators, automatic chlorine residual meters, chlorine contact tank baffles, and expanded chlorine solution piping will be added as part of the Chlorination Improvements. The improvements are intended to correct problems with effluent disinfection as well as to improve the operating efficiency and accuracy of the chlorination system.

The existing chlorination equipment is designed to accommodate only two secondary effluent streams. Since the proposed prison improvements will add another secondary treatment unit, and hence another effluent stream, an expansion of chlorination capacity is necessary.

Past operating experience has shown that feed rates of approximately 60-90 pounds per day of chlorine are necessary to achieve fecal coliform destruction, although higher feed rates may be necessary in the future to meet fecal coliform limits. At the present time, care must be taken to prevent excessive chlorine residuals in the effluent, because short circuiting of effluent in the existing chlorine chambers often causes fecal coliform violations with chlorine residuals approaching or even exceeding residual chlorine limits. The Chlorination Improvements were designed to correct this problem.

The existing chlorination equipment injects chlorine gas into secondary clarifier effluent water from the existing north secondary clarifier. The water is pumped by either of two chlorine water pumps, each rated for 40 GPM at 120 feet of head. Only one pump is normally used, and a standby pump is provided for use if the primary chlorine water pump fails.

IEPA design criteria for effluent disinfection using chlorination requires a detention time of at least 15 minutes at peak hourly flows. A dosage of 6 parts per million chlorine is recommended for disinfecting activated sludge plant effluent, which at 4.5 MGD would correspond to a daily feed rate of 225 pounds per day of chlorine. IEPA recommends considering the use of 1-ton chlorine containers if chlorine consumption is over 150 pounds per day.

The NPDES permit limits that apply to the effluent from the treatment facility are 400 fecal coliform colonies per 100 milliliters of effluent and 0.75 parts per million residual chlorine.

In order to accommodate the additional effluent stream, it is recommended that another automated chlorinator and chlorine residual meter be added for the effluent from the new secondary treatment unit. It is also recommended that the existing chlorine water pumps be increased in capacity to a rating of 70 GPM at 120 feet of head. These improvements could be accomplished within the existing chlorination control room.

Although chlorine feed rates may exceed 150 pounds per day, it is not recommended that 1-ton chlorine cylinders be considered for use for the Pekin facility at this time. The use of 1-ton cylinders is not recommended because of a lack of large storage area, space constraints in the unloading area, and difficulty in handling the heavy containers (especially in tight quarters). If future experience indicates sufficient problems with using 150 pound cylinders, additional consideration could be given to the use of 1-ton cylinders.

Also, to accommodate the additional effluent stream it will be necessary to construct another chlorine contact chamber. The new chamber will be baffled and will serve only the flow from the new secondary treatment unit.

Chlorine is applied to the return sludge flow in the reaeration zones to control filamentous bacteria in the aeration system. Two manual chlorinators are used for this purpose. To provide chlorine for application to return sludge in the new reaeration zone, piping would be extended from the existing piping control manhole adjacent to the north secondary treatment unit. No additional manual chlorinators would be necessary.

VIII. Sludge Handling / Processing

The existing sludge handling facilities consist of a gravity belt thickener system, vacuum sludge drying beds, sludge storage pad, sludge storage lagoons, and associated piping and metering. Some of these facilities were added during the recently completed Sludge Processing and Flood Protection Improvements.

The gravity belt thickener system consists of a 2.5 meter width gravity belt sludge thickener, a 2 GPH variable rate polymer feed system, a rotary lobe thickened sludge pump, waste activated sludge flow metering, and a PLC based control system.

The waste activated sludge pump is capable of pumping approximately 300 GPM as equipped, although rates of 250-275 GPM are more commonly used at Pekin. The gravity belt thickener (GBT) is rated by the manufacturer for dewatering sludge flows of up to 400 GPM. The GBT polymer feed system is capable of raw polymer flows of up to 2 GPM, and actual experience has shown that polymer flows of 0.75-1.0 GPM are sufficient to dewater sludge flows of 250-275 GPM. The polymer system could then be used to dewater Pekin's waste activated sludge with flows up to 500 GPM.

The rotary lobe thickened sludge discharge pump is rated for up to 60 GPM at relatively low discharge heads of approximately 25 feet. Actual operating experience has shown that lower pumping rates are more typical due to higher heads encountered pumping through the heat exchanger and pumping against the head imposed by the primary sludge pumps. Under such high head conditions, the thickener discharge pump sometimes is unable to keep up with the flow of sludge from the GBT, limiting the waste activated sludge flow that can be processed. At the present time, the thickened sludge pump is the most restrictive element governing GBT sludge handling capacity.

IEPA design criteria does not require specific or numerical capacities for gravity belt thickeners and pumping systems.

In order to maximize efficiency of the gravity belt thickener and to use higher waste activated sludge flows, it is recommended that the existing thickened sludge discharge pump be increased in capacity or replaced. A thickened discharge pump capable of 75-100 GPM at 55-60 feet of head would allow processing higher waste activated sludge flows. The other GBT equipment appears to be adequately sized to handle the increases attributable to the federal prison.

The vacuum sludge drying beds consist of four 20-foot by 40-foot vacuum drying beds, an 8 GPH variable rate polymer feed system, two vacuum pumps, two filtrate pumps, digested sludge flow metering, and a PLC based control system. The vacuum beds system is housed in the drying beds building.

The vacuum drying beds system is capable of dewatering up to 24,000 gallons of digested sludge in one application. Digested sludge is treated with polymer and applied to the beds, and then dried with an application of vacuum to porous plates under the sludge. Application and drying cycle times usually range from as little as 24 hours to as much as 48 hours or more. Dried sludge is then removed from the beds using a tractor-loader, and the porous plates are washed and readied for reuse.

IEPA design criteria does not require specific or numerical capacities for vacuum sludge drying bed systems.

For a design average flow of 4.5 MGD, the secondary anaerobic digesters could be expected to produce approximately 17,438 gallons of digested sludge per day, or 122,000 gallons per week.

If the vacuum drying bed system were operated on a 7 day per week routine with 24 hour turnaround, it would be possible to dewater almost 168,000 gallons of digested sludge per week. If operated on a 5 day per week basis, the vacuum drying beds system could dewater up to 120,000 gallons per week of digested sludge, or enough to match production at the proposed design average flow.

However, actual operating experience has shown that some batches of digested sludge require more than 24 hours to dewater. Based on a more conservative approach, it may be possible to process a 24,000 gallon batch of digested sludge every 48 hours. At such a utilization rate, the vacuum drying beds system would be capable of dewatering up to 84,000 gallons per week of digested sludge, somewhat less than production at the proposed design average flow.

In order to facilitate rapid turn-around of the vacuum drying beds system, it is recommended that capacity and automation improvements be made to the existing system. The use of a motorized proportioning flow control valve for digested sludge flow to the beds would increase the efficiency, accuracy, and ease of use. Larger vacuum pumps would allow more rapid dewatering, which would be especially important to achieving quick turn around time.

Consideration will also be given to adding an auxiliary form of sludge dewatering, such as a belt press or centrifuge.

The sludge storage pad consists of one 60-foot by 100-foot concrete storage pad. Additional sludge generation as a result of the federal prison is expected to demonstrate that the storage pad can rapidly be filled to capacity with sludge removed from the vacuum beds. An expansion of dried sludge storage capacity is recommended. It is recommended that a portion of the existing liquid sludge lagoon area be utilized for dried sludge storage prior to distribution. These improvements would require roadway access to the new storage area, and a replacement of berms to isolate lagoons retained for liquid sludge storage. A provision for pumping excess water draining from stored sludge and storm water run-off may be necessary.

The existing liquid sludge storage lagoons consist of approximately 525,000 cubic feet of storage. As previously mentioned, a portion of the sludge storage lagoons will be utilized for a new primary clarifier and for dried sludge storage. No less than 150,000 cubic feet of storage capacity will be retained for liquid sludge storage.

IX. Anaerobic Digestion

The existing anaerobic digester system consists of a primary digester, secondary digester, old digesters designated for sludge storage, gas recovery and conditioning equipment, and miscellaneous meters and controls.

The primary digester consists of one 50-foot diameter primary digester tank, a dual-fuel sludge heat exchanger, a 300 GPM sludge recirculation pump, a complete mix digester gas system, gas collection, condensate recovery, and conditioning system, gas volume and usage metering, sludge level and floating cover level metering. The primary digester was built in 1989 and designated as the #1 digester.

The secondary digester consists of a 50-foot diameter secondary digester tank, a natural gas fired sludge heat exchanger, and a sludge recirculation pump. The secondary digester was built in 1963 and is designated as the #2 digester.

The old digesters consist of two 35-foot diameter tanks originally equipped with floating covers and heating equipment. The digesters have only been used occasionally since the #2 digester was built in 1963.

The existing digesters are normally operated as primary and secondary units, with raw sludge being fed to the #1 digester and supernatant being transferred to the #2 digester. However, at times the #2 digester is utilized as a primary digester when lab data indicates that the #1 digester is becoming overloaded. The #1 digester is completely mixed and heated. The #2 digester is only mixed and heated if raw sludge is being fed into it, and the existing mixing system is not considered a true complete mix system.

Digester gas produced by the #1 digester is collected and used for fuel by the sludge heat exchanger and by generator G-1. The floating cover on the #1 digester can store up to approximately 20,000 cubic feet of gas. Excess gas production is flared using a waste gas burner. Digester gas produced by the #2 digester is normally flared using another waste gas burner. Originally the 1963 heat exchanger for the #2 digester was designed to burn either digester gas or natural gas, but the digester gas system did not work correctly and was abandoned.

IEPA's design criteria for anaerobic digesters requires that organic loadings to complete mix digesters not exceed 80 pounds of volatile TSS per 1000 cubic feet of volume per day (80 LBS VTSS/1000 CF/DAY). IEPA also requires digester gas metering for each digester unit. The new digester has a volume of 56,990 CF, corresponding to a maximum daily organic loading of 4559 LBS VTSS.

The existing organic load to the #1 digester is approximately 4641 LBS VTSS per day, slightly in excess of IEPA's design criteria. Using the proposed design average flow of 4.5 MGD, approximately 6143 LBS VTSS per day could be treated by the facility. Based on this projected loading, a completely mixed digester volume of at least 76,780 CF would be necessary.

It is recommended that the existing #2 digester be upgraded to a completely mixed primary digester, increasing total primary digester volume to approximately 104,100 CF. The upgrade would include a complete mix system, a new sludge heat exchanger, a new sludge recirculation pump, gas metering and piping, replacement cover, safety devices, temperature and level sensing equipment, and controls. Digester gas collected could be combined with gas from the #1 digester and used as fuel for either sludge heat exchanger, the G-1 engine-generator, or other generators and/or blower engines.

It is also recommended that the two old digesters be converted to secondary digesters to accept digested sludge from the two primary digesters. The old digesters would be covered but would not be heated, and any gas collected would be flared. The old digesters would be alternately filled with digested sludge transferred from the primary digesters, and the sludge then allowed to supernatant prior to dewatering on the vacuum drying beds. Improvements would include new flexible covers, new gas piping, new sludge valves, some replacement sludge piping, level indication and controls, building repair, ventilation, heating, and applicable site work. Sludge transfer pumping facilities may also be necessary. Both digesters would require a structural examination for evidence of freezing and thawing damage over the years, as well as damage caused by tree roots, rusting, etc. Structural repairs may be needed. Each of the old digesters would provide over 32,000 CF (240,000 GAL) of storage capacity.

X. Metering / Instrumentation / Controls

The existing treatment plant provides metering of important sewage, sludge, and digester gas flows, which are used for process control and record keeping purposes.

Existing sewage flows are measured as follows:

1. Influent to East Primary Clarifiers
2. Influent to West Primary Clarifiers
3. Effluent from North Secondary Chlorine Zone
4. Effluent from South Secondary Chlorine Zone

To accommodate the Prison Improvements, it is recommended that additional sludge metering be added. Recommended meters are as follows:

1. Influent to the new primary clarifier
2. Effluent from the new secondary clarifier

Existing sludge flows are measured as follows:

1. Sludge to the Gravity Belt Thickener
2. Sludge to the Vacuum Drying Beds

The Primary and Sludge Pumping Improvements Project will add the following sludge meters:

1. Primary sludge to the digesters
2. Primary sludge density

To accommodate the Prison Improvements, it is recommended that additional sludge metering be added. Recommended sludge meters are as follows:

1. Return sludge from the north secondary clarifier
2. Return sludge from the south secondary clarifier
3. Return sludge from the new secondary clarifier
4. Waste sludge from the north secondary clarifier
5. Waste sludge from the south secondary clarifier
6. Waste sludge from the new secondary clarifier
7. Sludge feed to #1 digester
8. Sludge feed to #2 digester
9. Digester supernatant to primary treatment
10. Digested sludge to the lagoons

Existing digester gas meters are as follows:

1. Digester gas produced by #1 digester
2. Digester gas consumed by the G-1 engine-generator

To accommodate the Prison Improvements, it is recommended that additional digester gas metering be added. Recommended meters are as follows:

1. Digester gas produced by #2 digester

The existing treatment plant also uses various meters to measure process parameters used in the control of plant operations. Meters used for process control are as follows:

1. North contact aeration dissolved oxygen
2. South contact aeration dissolved oxygen

The Chlorination Improvements Project will add the following process meters:

1. North chlorine contact chamber chlorine residual
2. South chlorine contact chamber chlorine residual

To accommodate the Prison Improvements, it is recommended that additional process metering be added. Recommended meters are as follows:

1. New contact aeration dissolved oxygen
2. New chlorine contact chamber chlorine residual

XI. Electrical Service / Utilities

The existing electrical distribution system provides two main feeds to the treatment plant. The two feeds are totally separate and serve different systems.

The south plant feed powers MPDP-2, which in turn feeds power and distribution panels throughout the plant. MPDP-2 is also fed by the 150 KW G-1 engine-generator during power failures.

Designated emergency loads are fed from EPDP-2. EPDP-2 can also be fed by the 80 KW G-2 engine-generator.

The north plant feed powers only the 200 HP electric blower in the Blower building. The 200 HP electric blower is normally used only during off-peak hours.

To accommodate the proposed prison improvements, an examination of on-peak potential loads will be made, with possible recommendations for increased generating capacity and/or a restructuring of plant electrical distribution. The list of designated emergency loads will also be revised to include new equipment and systems, in order to maintain critical equipment in the event of a power failure.

APPENDIX A

BASIS OF DESIGN

CITY OF PEKIN
WASTEWATER TREATMENT PLANT NO. 1

BASIS OF DESIGN

A. BASIC DATA

(1) GENERAL

Design Year	1991
Population Served	47,375
Pekin Datum + 378.56 = USGS Datum	

(2) WASTEWATER QUANTITIES

Annual Average Flow - MGD	3.85
Design Average Flow - MGD	4.50
Components:	
Fayette Combined Sewer Flow - MGD	1.88
North Pekin Interceptor Flow - MGD	1.63
South Side Sewer Flow - MGD	0.96
Front Street Sewer Flow - MGD	0.03
Design Maximum Flow - MGD	8.74
Components:	
Fayette Combined Sewer Flow - MGD	3.08
North Pekin Interceptor Flow - MGD	2.94
South Side Sewer Flow - MGD	1.80
Front Street Sewer Flow - MGD	0.92

(3) INFLUENT WASTEWATER CHARACTERISTICS

Design Averages

Biochemical Oxygen Demand - MG/L	218
Biochemical Oxygen Demand - LBS/DAY	7902
Suspended Solids - MG/L	265
Suspended Solids - LBS/DAY	9612

B. PRETREATMENT FACILITIES

(1) MECHANICAL BAR SCREEN

Maximum Flow - MGD	5.70
Clear Bar Spacing - Inches	0.75
Bar Size - Inches	0.25 x 1.50
Inclination - Degrees off Vertical	30
Type	Toothed Rake
Drive	Hydraulic
Horsepower	1.5

(2) CHANNEL SCREENINGS GRINDER

Maximum Flow - MGD	>9.0
Type	Rotating Screen
Drive	Hydraulic
Horsepower	7.5
Cutters	Dual Rotating

(3) GRIT REMOVAL TANKS

Number of Tanks	2
Maximum Flow per Tank - MGD	5.18
Detention Time at Max Flow - Minutes	8.26
Type of Tank	Aerated
Air Consumption per Tank - CFM	60
Dimensions of Tank - Feet	16 x 16
Sidewall Depth - Feet	11.62
Weir Elevation - USGS Datum	443.5

(4) GRIT HANDLING SYSTEM

Removal Capacity, Each Tank - CF/HR	90
CF/DAY	2160
CY/DAY	80
Grit Pumps Type	6" Air lift
Pump Air Consumption per Tank - CFM	50
Grit Separation Type	Settling Tank
Grit Transport	Screw Auger
Grit Storage/Disposal	Wheeled Hopper

C. PRIMARY TREATMENT FACILITIES

(1) PRIMARY CLARIFIERS

Type of Tanks	Circular Overflow
Total Number of Tanks	5
Number of 45 Foot Diameter Tanks	2
Number of 55 Foot Diameter Tanks	3
Average Water Depth - Feet	8.8
Total Surface Area - SQ FT	10,308
Surface Loading at Max Flow - GAL/SQ FT/DAY	848
Total Volume - CF	88,400
Total Volume - GAL	661,232
Detention time at Max Flow - Minutes	109
Detention Time at Average Flow - Minutes	211
Weir Elevation - USGS Datum	442.4
BOD Removal Rate - Percent	30%
TSS Removal Rate - Percent	60%

(2) PRIMARY SLUDGE PUMPS

Total Number of Pumps	2
Plunger Pump Size	11" Simplex
Plunger Pump Capacity - GPM	136
Plunger Pump Drive Type	Electric, Fixed
Motor Horsepower	5
Rated Head - Max Feet	115
Diaphragm Pump Size	4" Simplex
Diaphragm Pump Capacity - GPM	180
Diaphragm Pump Drive Type	Air, Variable
Air Requirement - SCFM	50
Design Head - Feet	52

(3) PRIMARY EFFLUENT CHARACTERISTICS

Average Flow - MGD	4.5
Biochemical Oxygen Demand - MG/L	153
Biochemical Oxygen Demand - LBS/DAY	5532
Suspended Solids - MG/L	106
Suspended Solids - LBS/DAY	3845

D. SEWAGE PUMPING FACILITIES

(1) PRIMARY EFFLUENT PUMPING

Type	Submersible
Total Number of Pumps	5
Horsepower of Each Pump	20
Maximum Capacity, All Pumps - MGD	12.4
Maximum Capacity, Less One Pump - MGD	9.5
Lift - Feet TDH	23.5

E. SECONDARY TREATMENT FACILITIES

(1) GENERAL

Design Average Flow - MGD	4.5
Design Maximum Flow - MGD	8.7
Biochemical Oxygen Demand - LBS/DAY	5532
Suspended Solids - LBS/DAY	3845

(2) AERATION TANKS

Total Number of Tanks	6
Contact Aeration Tanks	3
Reaeration Tanks	3
Total Volume All of Tanks:	
Cubic Feet	164,700
Gallons	1,231,956
Water Elevation - USGS Datum	453.9
Volume of All Contact Aeration Tanks:	
Cubic Feet	82,350
Gallons	615,978
Volume of All Reaeration Tanks:	
Cubic Feet	82,350
Gallons	615,978

Biochemical Oxygen Demand Loading:

Design Peak Loading - BOD LBS/DAY	8235
Loading Rate at Peak - LBS/TCF/DAY	50
Average Primary Effluent - BOD LBS/DAY	5532
Average Loading Rate - LBS/TCF/DAY	33

Applied Air:

Design Application Rate - CF/LB BOD	1500
Design Oxygen Transfer Rate - LB OXY/LB BOD	1.0
Air Requirement for Design Peak Load - CFM	8578
Air Requirement for Primary Effluent - CFM	5762

Mixed Liquor:

Suspended Solids - MG/L	4000
Volatile Solids - Percent	70%
Dissolved Oxygen Level:	
Average Loading - MG/L	4.0
Peak Loading - MG/L	2.0
Return Sludge Rate - Percent	70%

(3) MECHANICAL AERATION EQUIPMENT

Blowers:

Type	Positive Displacement
Number of Blowers	4
Total Capacity - CFM	14,000

Engine Blowers:

Number Engine Blowers	2
Rated Capacity, Each - CFM	3500
Engine Size - Cylinders	6
Engine Horsepower	
Engine Fuel	Natural Gas
Engine Speed - RPM	1200, Variable

Electric Blowers:

Number Electric Blowers	2
Rated Capacity - CFM	3500
Motor Horsepower	200
Motor Voltage - VAC	480
Motor Speed - RPM	1175
Drive Type	Variable speed VFD

(4) SECONDARY CLARIFIERS

Total Number of Tanks	3
Type of Tanks	Circular Overflow
Diameter of Tanks - Feet	70
Average Water Depth, Existing Tanks - Feet	11.5
Average Water Depth, New Tank - Feet	13
Total Surface Area - SQ FT	11,218
Surface Loading at Max Flow - GAL/SQ FT/DAY	779
Total Volume:	
Cubic Feet	63,450
Gallons	474,606
Detention time at Max Flow - Minutes	78
Detention Time at Average Flow - Minutes	152
Weir Elevation - USGS Datum	453.9
Mixed Liquor Solids - MG/L	4000
Return Sludge Rate - Percent	70%
Peak Flow Including Return Sludge - MGD	14.86
Solids Loading - LBS/DAY/SQ FT	44.2
BOD Removal Rate - Percent	90%
TSS Removal Rate - Percent	80%

(5) RETURN SLUDGE PUMPS

Total Number of Pumps	4
Air Lift Type	2
Centrifugal Non-clog Type	2
Total Rated Capacity - MGD	8.8
Air Lift Pumps:	
Size - Inches	12
Rated Capacity, Each - MGD	1.4
Air Consumption, Each - CFM	75
Output	Variable
Output Proportional Type	Flow Paced
Centrifugal Pumps:	
Size - Inches	6
Rated Capacity, Each - MGD	3.0
Drive	Electric
Output Speed	Variable
Output Proportional Type	Flow Paced

(6) RETURN SLUDGE CHLORINATION

Total Number of Chlorinators	2
Equipment Type	Solution Feed Vacuum
Injector Water Flow, Each - GPM	9.0
Piping Head Loss - Feet	12
Rated Capacity, Each - LBS/DAY	100
Point of Application	Return Sludge
Control Type	Manual
Control Parameter(s)	SVI, Micro-exam

(7) WASTE ACTIVATED SLUDGE STORAGE / PUMPING

Total Number of Pumps	4
Air Lift Type	2
Centrifugal Non-clog Type	2
Total Rated Capacity - MGD	2.8

Air Lift Pumps:

Size - Inches	6
Rated Capacity, Each - MGD	0.40
Air Consumption, Each - CFM	23
Output	Variable
Output Proportional Type	Manual Setting

Centrifugal Pumps:

Size - Inches	4
Rated Capacity, Each - MGD	1.0
Drive	Electric
Output Speed	Variable
Output Proportional Type	Setpoint Rate

Waste Activated Sludge Storage:

Storage Type	Open Tank
Location of Storage Tank	South Aerobic Digester
Volume of Storage:	
Cubic Feet	46,300
Gallons	346,325
Decant Pump Type	Air Lift
Decant Pump Size - Inches	6
Rated Capacity, Each - MGD	0.72
Air Consumption, Each - CFM	40
Decant Adjustment	Telescoping Valve

(8) SECONDARY EFFLUENT CHARACTERISTICS

Average Flow - MGD	4.5
Biochemical Oxygen Demand - MG/L	15
Biochemical Oxygen Demand - LBS/DAY	574
Suspended Solids - MG/L	21
Suspended Solids - LBS/DAY	796

F. EFFLUENT CHLORINATION FACILITIES

(1) CHLORINATION EQUIPMENT

Total Number of Chlorinators	3
Equipment Type	Solution Feed Vacuum
Injector Water Flow, Each - GPM	9.0
Piping Head Loss - Feet	12
Rated Capacity, Each - LBS/DAY	100
Point of Application	Contact Chamber
Control Type	Automatic
Control Parameter(s)	Residual & Flow
Number of Chlorine Water Pumps	2
Rated Capacity, Each - GPM	70
Rated Head - Feet	120

(2) CHLORINE CONTACT CHAMBERS

Total Number of Tanks	3
Circular Segments	2
Rectangular	1
Total Volume All of Tanks:	
Cubic Feet	19,025
Gallons	142,000
Detention Time at Peak Flow - Minutes	23.4
Detention Time at Average Flow - Minutes	44.8
Volume of Each Circular Segment:	
Cubic Feet	5500
Gallons	41,000
Weir Elevation - USGS Datum	450.9
Volume of Rectangular Tank:	
Cubic Feet	8025
Gallons	60,000
Weir Elevation - USGS Datum	450.9

(2) FINAL EFFLUENT CHARACTERISTICS

Average Flow - MGD	4.5
Biochemical Oxygen Demand - MG/L	15
Biochemical Oxygen Demand - LBS/DAY	574
Suspended Solids - MG/L	21
Suspended Solids - LBS/DAY	796
Fecal Coliform - Colonies per 100 ML:	
April 1 - October 31	<400
November 1 - March 31	NA
Peak Flow - MGD	8.74

G. STORMWATER BYPASS CONTROL FACILITIES

(1) GENERAL

The plant is designed to bypass flows in excess of 8.74 MGD to the Stormwater Basin and Stormwater Chlorination Chamber. After sedimentation in the Stormwater Basin, flows are disinfected using chlorine and discharged to the Illinois River.

(2) STORMWATER SETTLING BASIN

Basin Volume:	
Cubic Feet	29,886
Gallons	223,547
Maximum Flow Rate - MGD	13.89

(3) STORMWATER CHLORINATION

Chlorination Chamber Volume:	
Cubic Feet	10,053
Gallons	75,197

Chlorination Equipment:

Total Number of Chlorinators	2
Equipment Type	Solution Feed Vacuum
Injector Water Flow, Each - GPM	20.0
Piping Head Loss - Feet	12
Rated Capacity, Each - LBS/DAY	500
Point of Application	Chlorine Manhole
Control Type	Manual
Control Parameter(s)	Basin Level

H. SLUDGE HANDLING FACILITIES

(1) SLUDGE THICKENING

A. Waste Activated Sludge Transfer Pump

Number of Pumps	1
Rated Capacity - GPM	300
Rated Head - Feet	
Pump Size - Inches	3
Motor Horsepower	5
Motor Speed - Max RPM	1740
Motor Speed Control	Variable (VFD)
Speed Control Parameter	Setpoint Flow
Drive Type	Direct, V-Belt

B. Gravity Belt Thickener

Belt Width - Meters	2.5
Rated Capacity GPM	400
Typical Inlet Solids - %TS	0.75%
Typical Discharge Solids - %TS	5.0%
Solids Capture - Percent	95%
Wash Water - GPM	55
Motor Horsepower	5
Motor Speed - RPM	1740, Fixed
Drive Type	Hydraulic
Drive Speed	Adjustable
Drive Speed Control	Knob Setting

C. GBT Polymer Mixing/Addition

Polymer Feed Rate:	
Minimum - GPH	0.6
Maximum - GPH	2.0
Water Feed Rate - Max GPH	100
Mixer Motor Horsepower	1/6
Mixer Motor RPM	1700

D. Thickened Sludge Pump

Rated Capacity - GPM	100
Pump Size - Inches	4
Motor Horsepower	7.5
Motor Speed - Max RPM	3600
Motor Speed Control	Fixed
Drive Type	Direct, V-Belt
Drive Speed	Adjustable Sheave
Drive Speed Control	Hand Crank
Control Parameter	Setpoint Flow

(2) ANAEROBIC DIGESTION

A. Complete Mix Mesophilic Digestion Tanks

Number of Tanks	2
Total Volume:	
Cubic Feet	104,113
Gallons	778,765
Complete Mix Type	Gas gun
Total Gas Storage Capacity - CF	40,000
No. 1 Tank:	
Tank Diameter - Feet	50
Sidewall Depth - Feet	38.7
Volume:	
Cubic Feet	56,990
Gallons	426,285
Max Liquid Elevation - USGS	474.3
No. 2 Tank:	
Tank Diameter - Feet	50
Sidewall Depth - Feet	24.0
Volume:	
Cubic Feet	47,123
Gallons	352,480
Max Liquid Elevation - USGS	466.56

B. Sludge Feed to Digesters

Primary Sludge:	
Gallons per day	22,480
Solids Content - % TS	3.0
TSS - LBS/Day	5625
VTS %	70%
VTS - LBS/DAY	3938
Thickened Waste Activated Sludge:	
Gallons per day	6295
Solids Content - % TS	6.0%
TSS - LBS/Day	3150
VTS %	70%
VTS - LBS/DAY	2205
Combined (Total) Sludge Feed:	
Gallons per day	28,775
Avg. Solids Content - % TS	3.6%
TSS - LBS/Day	8775
VTS %	70%
VTS - LBS/DAY	6143
Volatile Solids Loading	
LBS/1000 CF/DAY	59.0

C. Digested Sludge Production

Gallons per day	28,775
Solids Content - % TS	2.1%
TSS - LBS/Day	5090
VTS %	42%
VTS - LBS/DAY	2138
Volatile Solids Destruction - LBS/DAY	4005
Detention Time - Days	27.1
Volatile Solids Destruction - Percent	60%

D. Digester Gas Production

Methane Content - Percent	60%
Cubic Feet per LB VTS Destroyed	14
BTU/CF	600
Total Cubic Feet Produced:	
Per Day	56,070
Per Hour	2336

E. Sludge Recirculation Pumps

Number of Pumps	2
Rated Capacity Each - GPM	300
Rated Head - Feet	28
Pump Size - Inches	4
Motor Horsepower	5
Motor Speed - RPM	870, Fixed
Motor Speed Control	Variable (VFD)
Drive Type	Direct Coupled

F. Sludge Heat Exchangers

Number of Heat Exchangers	2
Natural Gas Input - BTU/HR	
Digester Gas Input - BTU/HR	

G. Waste Gas Burner

Number of Burners	1
Burner Piping Size - Inches	2
Burner Capacity - CF/HR	3850
Ignition Type	Automatic Spark

(3) DIGESTED SLUDGE STORAGE

A. Secondary Digestion Tanks

Number of Tanks	2
Tank Diameter - Feet	35
Sidewall Depth - Feet	38
Volume, Each Tank:	
Cubic Feet	32,650
Gallons	244,222
Total Volume:	
Cubic Feet	65,300
Gallons	488,444
Max Liquid Elevation - USGS	474.5
Supernatant Removed - Gallons/Day	11,337
Digested Sludge Solids - %TS	3.5%
Digested Sludge Solids - Gallons/Day	17,438

B. Waste Gas Burner

Number of Burners	1
Burner Piping Size - Inches	2
Burner Capacity - CF/HR	3850
Ignition Type	Automatic Spark

(4) DIGESTED SLUDGE DEWATERING

A. Vacuum Drying Beds

Number of Beds	4
Size of Beds, Each - Feet	20 x 40
Sludge Application Depth - Inches	12
Wet Sludge Solids - %TS	3.5%
Dried Sludge Solids - %TS	15-20%
Turn-around Time - Minimum Hours	24

Sludge Application (Fill all four Beds):

Cubic Feet	3200
Gallons	23,936

B. Polymer Mixing/Addition

Polymer Feed Rate:	
Minimum - GPH	0.04
Maximum - GPH	8.0
Water Feed Rate - Max GPM	10

C. Vacuum Pumps

Number of Pumps	2
Pump Type	Positive Displacement
Pump Stages	Single
Motor Horsepower	2.5

D. Filtrate Pumps

Number of Pumps	2
Pump Type	Centrifugal
Pump RPM	1750
Motor Horsepower	3
Spherical Solids Rating - Inches	3

(5) <u>DRIED SLUDGE STORAGE</u>

A. Sludge Storage Pad

Pad Size - Feet	60 x 100
Avg Sludge Depth - Feet	3
Max Storage Capacity - CF	18,000
Avg Sludge Solids - %TS	15%
Storage for Production - Days	33

B. Outdoor Lagoon Area

Number of Lagoons	1
Area of Lagoon - SQ FT	20,250
Max Sludge Depth - Feet	4
Max Storage Capacity - CF	81,000
Avg Sludge Solids - %TS	15%
Storage for Production - Days	149

(6) <u>LIQUID SLUDGE STORAGE LAGOONS</u>

Number of Lagoons	2
Area of Lagoons - SQ FT	47,900
Max Sludge Depth - Feet	4
Max Storage Capacity:	
Cubic Feet	191,600
Gallons	1,433,170
Avg Sludge Solids - %TS	3.5%
Storage for Production - Days	82

I. ENERGY PRODUCTION AND UTILIZATION

(1) ENGINE GENERATORS

Number of Generators		2
Capacity of Each Generator:		
	Kilowatts (KW)	150
	Amps (460-480 VAC)	180

Fuel Consumption of Each Generator, CF/HR:

Nat Gas, 100% Load	1800
Nat Gas, 75% Load	1460
Nat Gas, 50% Load	1140
Nat Gas, 25% Load	715
Dig Gas, 100% Load	3000
Dig Gas, 75% Load	2433
Dig Gas, 50% Load	1900
Dig Gas, 25% Load	1192

(2) UTILITY ON-PEAK RATE STRUCTURE

On-Peak Months, CILCO Rate Structure 13:		
	Beginning	May 1
	Ending	Sept 15
On-Peak Hours, CILCO Rate Structure 13:		
	Beginning	10:00 AM
	Ending	10:00 PM
Cost per KWH, Summer (May 1-Sept 15):		
	First 200 KWH	$0.064
	Over 200 KWH	$0.032
Cost per KWH, Winter (Sept 16-April 30):		
	First 200 KWH	$0.053
	Over 200 KWH	$0.026
Demand Charge per KW On-Peak		$3.32
Minimum On-Peak Demand Charge		$0

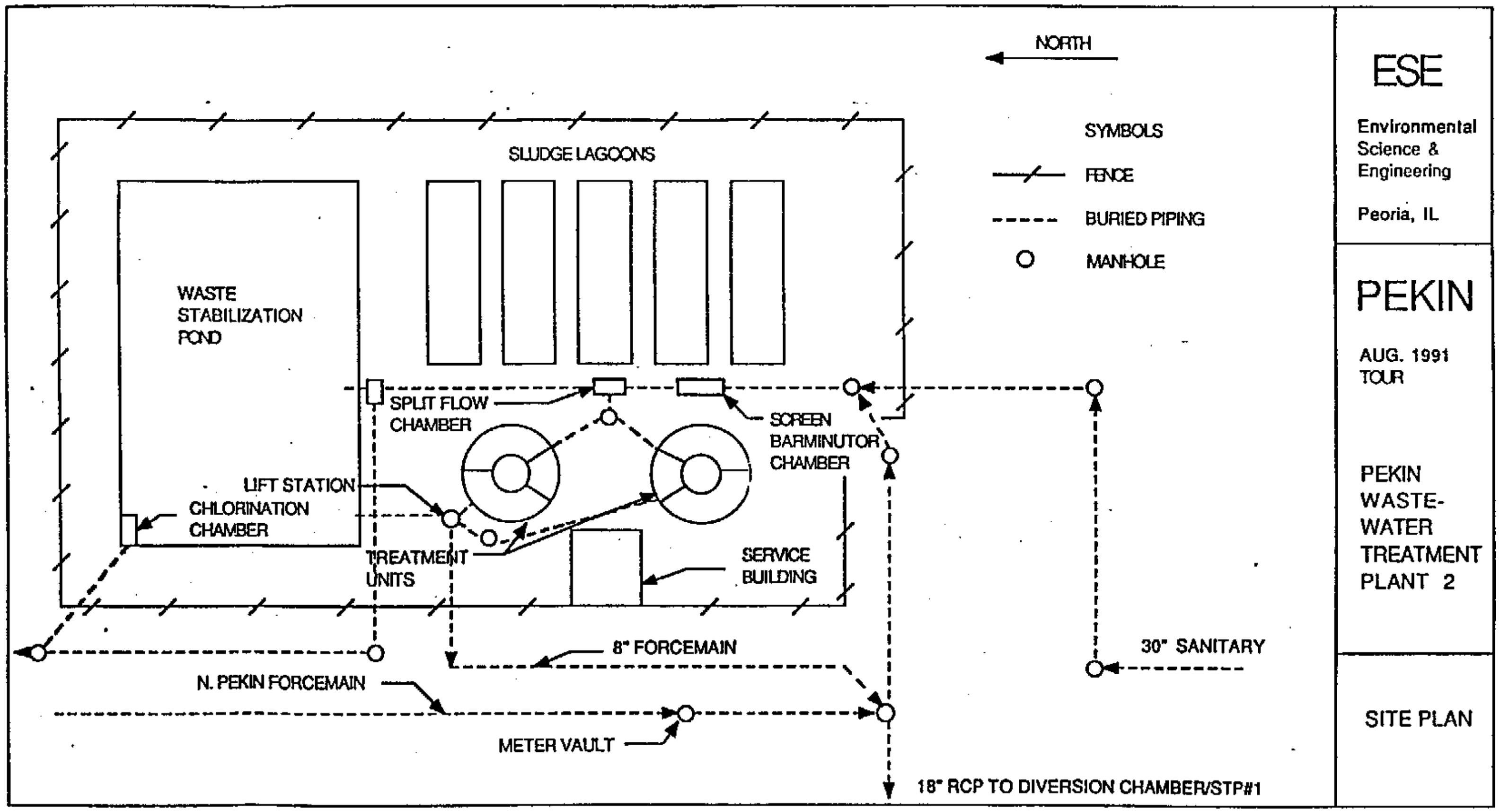
(3) GENERATOR OPERATING MODES

On-Peak Hours:

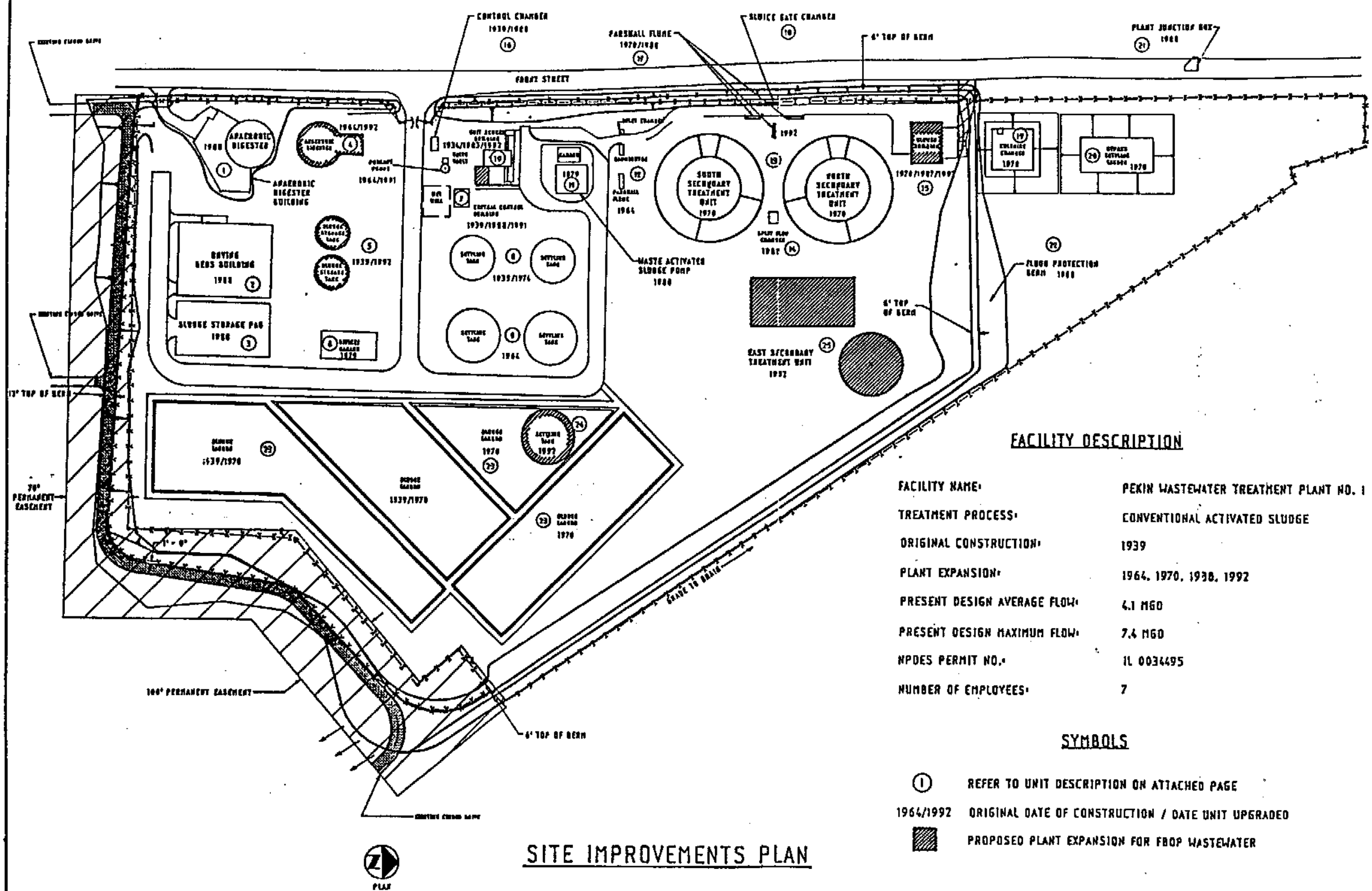
Engines to be Operated	2
Engine Start Time	9:45 AM
Percent Loading	100%
Run Time on Dig Gas, Hours/Day	9.34
Run Time on Nat Gas, Hours/Day	3.16
Engine Stop Time	10:15 PM
KWH Produced/Day	3750

Off-Peak Hours:

Engines to be Operated	1
Engine Start Time	N/A
Percent Loading	72%
Run Time on Dig Gas, Hours/Day	24.00
Run Time on Nat Gas, Hours/Day	0
Engine Stop Time	N/A
KWH Produced/Day	2592


NORTH
SYMBOLS
FENCE
BURIED PIPING
MANHOLE
SLUDGE LAGOONS
WASTE STABILIZATION POND
SPLIT FLOW CHAMBER
SCREEN BARMINUTOR CHAMBER
LIFT STATION
CHLORINATION CHAMBER
TREATMENT UNITS
SERVICE BUILDING
8" FORCEMAIN
30" SANITARY
N. PEKIN FORCEMAIN
METER VAULT
18" RCP TO DIVERSION CHAMBER/STP#1
ESE
Environmental Science & Engineering
Peoria, IL
PEKIN
AUG. 1991 TOUR
PEKIN WASTE-WATER TREATMENT PLANT 2
SITE PLAN

ATTACHMENT #2



SITE IMPROVEMENTS PLAN

FACILITY DESCRIPTION

FACILITY NAME:	PEKIN WASTEWATER TREATMENT PLANT NO. 1
TREATMENT PROCESS:	CONVENTIONAL ACTIVATED SLUDGE
ORIGINAL CONSTRUCTION:	1939
PLANT EXPANSION:	1964, 1970, 1938, 1992
PRESENT DESIGN AVERAGE FLOW:	4.1 MGD
PRESENT DESIGN MAXIMUM FLOW:	7.4 MGD
NPDES PERMIT NO.:	IL 0034495
NUMBER OF EMPLOYEES:	7

SYMBOLS

(1)	REFER TO UNIT DESCRIPTION ON ATTACHED PAGE
1964/1992	ORIGINAL DATE OF CONSTRUCTION / DATE UNIT UPGRADED
(hatched box)	PROPOSED PLANT EXPANSION FOR FBOP WASTEWATER

ESE

Environmental Science & Engineering, Inc.

PEKIN

AUG. 1991 TOUR

PEKIN WASTEWATER TREATMENT PLANT 1

REVISIONS

DATE: AUG. 1991

SITE IMPROVEMENTS LOCATIONS

Site Plan

GENERAL

SHEET 1 OF 1